



AT-1731  
[10191/899]

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:

Theodor GRASER et al.

For: METHOD FOR MANUFACTURING  
A SENSING ELEMENT

Filed: March 31, 1999

Serial No.: 09/194,773

Examiner: Christopher A. Fiorilla

Art Unit: 1731

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Assistant Commissioner  
for Patents  
Washington, D.C. 20231

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Date 8/27/2001 Atty's Reg. # 33,865

Atty's Signature AARON C. DEDITCH

**REPLY BRIEF TRANSMITTAL**

SIR:

Accompanying this Reply Brief Transmittal is a Reply Brief pursuant to 37  
C.F.R. § 1.193(b) for filing in the above-identified patent application, together with two  
courtesy copies thereof.

While no fee is believed to be due, the Commissioner is authorized to charge,  
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Respectfully submitted,

Dated: 8/27/2001

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[10191/899]



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Atty's Signature AARON C. DEBITCH

**REPLY BRIEF PURSUANT TO 37 C.F.R. § 1.193(b)**

SIR:

Appellant submits the present Reply Brief (the two-month response date for which is August 28, 2001) in response to the Examiner's Answer mailed on June 28, 2001 ("the Answer"). Although not required, two duplicate copies of this Reply Brief are also being submitted herewith as a courtesy to the Patent Office.

For the reasons set forth below and in the Appeal Brief mailed on April 16, 2001, the final rejections of claims 13, 14 and 24 should be reversed.

**REMARKS**

Claims 13 to 24 are now pending, of which claims 15 to 23 have been objected to and of which claims 13, 14 and 24 have been finally rejected.

As regards item two (2) of the Answer, the Examiner's comments are simply not understood since the Appeal Brief expressly states in section two (2), titled "RELATED APPEALS AND INTERFERENCES", that there are "no interferences or other appeals related to the present application, which 'will directly affect or be directly affected by or have

a bearing on the Board's decision in the pending appeal'".

As to claims 15 to 23, the Examiner only objected to these claims and has indicated that claims 15 to 23 contain allowable subject matter, and that these claims would be allowed if rewritten to overcome the indefiniteness rejections and to reflect the base claim and any intervening claim. In this regard, it is again respectfully submitted that claim 15 is now allowable since it has been previously rewritten to reflect claim 13 (as presented) and claim 14. As regards claims 16 to 23 that depend from claim 13, it is respectfully submitted that these claims are allowable as presented for the reasons discussed herein and in the Appeal Brief with respect to claim 13. Since the Examiner has entered the Amendment After Final, it is respectfully requested that he acknowledge that claim 15 is now allowed.

As regards the "Response to Argument" in item eleven (11) of the Answer, concerning whether claims 13, 14 and 24 are unpatentable under 35 U.S.C. § 103(a) over Kurishita in view of Nenadic, the following remarks are provided:

As regards Nenadic, it purportedly concerns a cutting assembly and an apparatus and method for self-aligned chamfering of a "Controlled Collapsed Chip Connector (C4) ball grid array (BGA) multilayer ceramic (MLC) package" workpiece, in which the chamfering apparatus includes a mechanism for releasably securing the workpiece for preparing to chamfer the workpiece, a cutting assembly, and a mechanism for moving the cutting assembly proximately with respect to the securing mechanism between a first position and a second position, in which the cutting assembly traverses along an edge portion of the workpiece to be chamfered. As stated, the cutting assembly includes: (i) a guide member having a guide surface; (ii) a blade member mechanically coupled with respect to the guide surface for establishing a desired cutting depth; (iii) a mechanism for applying a resilient tensioning force to the guide member, the "resilient tensioning means" applying a first tensioning force when the guide member is in a non-chamfer engaging position and applying a second tensioning force when the guide member is in a chamfer engaging position, the chamfer engaging position corresponding to a position of the guide member when the guide surface engages the portion of the workpiece to be chamfered; and (iv) a mechanism for locking the guide member to maintain the chamfer engaging position and the desired cutting depth subsequent to the guide surface no longer being in contact with the workpiece.

As further stated, the apparatus and method of the reference relied upon is directed to addressing the cracking problem caused by "fixture off" handling and/or processing. In particular, the Nenadic reference states that:

The smaller size of the ceramic chip carrier presents several problems. One such problem is not having an ability to chamfer both the edges 12 and the corners 14 (FIG. 1) of a ceramic substrate 10 in a reliable and repeatable manner with low loss yields. Corner and edge chamfers are required for both aesthetic reasons as well as for yield purposes. For instance, a sharp ceramic edge is very brittle and vulnerable to chipping and cracking. *During semiconductor chip device packaging processes, plating and bond & assembly processes typically fixture off (i.e., reference from) the substrate sides. As a result of fixturing off of the substrate sides, there are usually high yield losses associated with non-chamfered edges.* The problem is further complicated by tighter spacings between the substrate side and the active metallurgy of the package which results in less room for the chamfer. . . .

The chamfer tools presently used to chamfer PGA product are not suitable for BGA chamfering since the chamfer size which results from use of those tools will vary with the tolerance on the X-Y size and thickness (i.e., as a result of fixed cutter positions). Furthermore, the parts to be chamfered are typically moved, flipped and rotated several times in order to achieve 8 edge chamfers and 4 corner chamfers using such known chamfer tools. Increased handling of a substrate can be a cause for major yield problems in the chamfering of much thinner packages, also.

(See Nenadic, col. 1, lines 31 to 64) (emphasis added).

As regards Kurishita, it purportedly concerns a formed oxygen sensor, in which chamfering is applied to ridges formed parallel to the lengthwise direction of the already formed oxygen sensor element which is exposed to the gas to be measured. (See Kurishita, Abstract). Accordingly, this reference discloses no more information than is discussed in the Background Information of the present application, as referred to below.

In contrast, the subject matter of claim 13 is directed to addressing the entirely different problem of excessive heat causing cracking in the sensor element, which is used in relatively high temperature automotive applications. In this regard, the present application discusses, for example, the problem and the solution as follows:

*During testing of the sintered sensing element, or during utilization thereof as intended, the individual layers of the sensing element are exposed to different temperatures. Because of these sudden temperature changes which occur with differing intensity, the sensing elements experience a temperature shock which leads to the occurrence of mechanical*

*stresses in the surface region, in particular at the edges of the sensing element. [To] increase the temperature shock resistance of the sensing elements, . . . the edges of the sensing element [may be blunted or chamfered]. . . .*

The [exemplary] method . . . offers, in contrast, the advantage that blunting of the edges of the sensing element can be accomplished in a simple manner without the risk of impairing the sensing element. Because the edges of the sensing element are blunted prior to sintering, it is possible to blunt the edge in any desired geometry using simple, non-chip-removing methods. In particular, a blunting of the edges can be accomplished in a form deviating from a flat surface, for example in a convex or concave form, so that mechanical stresses which occur as a consequence of a temperature shock to the blunted edges cannot result in the creation of cracks.

(See Specification, page 2, line 1 to page 3, line 3) (emphasis added).

Accordingly, it is respectfully maintained and submitted that Nenadic is plainly a non-analogous reference with respect to the presently claimed subject matter, and therefore cannot be relied on to reject the claims under 35 U.S.C. § 103(a). To rely on a reference for the purpose of rejecting the presently claimed subject matter, the reference must be in either the field of the claimed subject matter or it must be reasonably pertinent to the particular problem with which the inventors were concerned. (See M.P.E.P. § 2141.01(a)). That is not the case here.

It is respectfully submitted that the Nenadic reference is plainly not in the field of the claimed subject matter for the above reasons, including the fact -- which is not in any way disputed in the Answer -- that it is directed to addressing the entirely different problem of cracking caused by "fixture off" handling in electronic substrates. This conclusion is supported by the fact that the primary and secondary references list different Fields of Search -- a fact conveniently ignored in the Answer and in the Office Actions to date.

It is therefore respectfully submitted that Nenadic simply does not concern the problem of sensor elements that may experience cracking due to high temperatures, which as discussed above is the problem that is addressed by the presently claimed subject matter. Thus, Nenadic is simply not in the field of the presently claimed subject matter. Additionally, the Nenadic reference is not reasonably pertinent to the particular problem relating to the presently claimed subject matter for the foregoing reasons.

Also, in the Answer, it is wrongly asserted that "Nenadic is clearly analogous"

because the “claimed process is a process of blunting or chamfering a ceramic a ceramic article”. In fact, claim 13 is specifically directed to a method for manufacturing a sensing element for determining oxygen content in exhaust gases of an internal combustion engine, including the steps of blunting edges of a composite arrangement for use as the sensing element to increase a thermal shock resistance of the sensing element, and sintering the composite arrangement to yield the sensing element, the composite arrangement including at least one ceramic paste present in film form. (See claim 13). As explained, the subject matter of claim 13 is directed to addressing the problems of sensor elements experiencing cracking due to high operating temperatures in an automotive environment.

Since the Final Office Action and the Advisory Action do not really address these facts in any way, it is again respectfully submitted that there is no motivation to combine or modify the Kurishita in view of the Nenadic reference.

Moreover, to reject a claim as obvious under 35 U.S.C. § 103, the prior art must disclose or suggest each claim element and it must also suggest combining the elements in the manner contemplated by the claim. (See Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 934 (Fed. Cir. 1990), cert. denied, 111 S. Ct. 296 (1990); In re Bond, 910 F.2d 831, 834 (Fed. Cir. 1990)). In this regard, the “problem confronted by the inventor must be considered in determining whether it would have been obvious to combine the references in order to solve the problem.” (See Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 679 (Fed. Cir. 1998)). It is respectfully submitted that the references relied on, whether taken alone or otherwise, do not suggest in any way combining the references so as to address the problems that are met by the presently claimed subject matter for the reasons discussed above, including the problem of excessive heat causing cracking in a sensor element that is used in relatively high temperature automotive applications.

In this regard, the Federal Circuit has made plain that:

[It] is well established that in deciding that a novel combination would have been obvious, there must be supporting teaching in the prior art. “That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown.”

There is no suggestion or motivation in the prior art to combine these elements as combined by Newell, in order to obtain enhanced tape velocity and acceleration. The motivation to make a specific structure “is not abstract, but practical, and is always related to the properties or uses one skilled in the art

would expect the [structure] to have, if made.”

[We have] discussed the need, in comparing the differences between the structure and properties taught in the prior art, and those of the applicant's invention, to include consideration of the problem solved by the inventor. “The determination of whether a novel structure is or is not ‘obvious’ requires cognizance of the properties of that structure and the problem which it solves, viewed in light of the teachings of the prior art.” *“Where the invention for which a patent is sought solves a problem which persisted in the art, we must look to the problem as well as to its solution if we are to properly appraise what was done and to evaluate it against what would be obvious to one having the ordinary skills of the art.”*

(See *In re Newell*, 13 U.S.P.Q.2d 1248, 1250 (Fed. Cir. 1989) (Board reversed; citations omitted; emphasis added)).

As further regards the necessity of considering the *particular* problem addressed by the claimed subject matter in any obviousness analysis, the Federal Circuit has also made plain that:

[The] problem confronted by the inventor must be considered in determining whether it would have been obvious to combine references in order to solve that problem. *In re Wright*, [6 U.S.P.Q.2d 1959 (Fed. Cir.1988)] (“whether a novel structure is or is not ‘obvious’ requires cognizance of the properties of that structure and the problem which it solves, viewed in light of the teachings of the prior art”); *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co .*, 730 F.2d 1452, 1462, 221 U.S.P.Q. 481, 488 (Fed. Cir. 1984) (“Nothing in the references alone or together suggests the claimed invention as a solution to the problem”); *In re Rinehart*, 531 F.2d 1048, 1054, 189 U.S.P.Q. 143, 149 (C.C.P.A. 1976) (**the particular problem facing the inventor must be considered in determining non-obviousness**). When determining obviousness, “[t]he invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time.” *Interconnect Planning Corp. v. Feil* , 774 F.2d 1132, 1143, 227 U.S.P.Q. 543, 551 (Fed. Cir. 1985).

(See *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d at 679) (bold emphasis added).

In view of the foregoing, it is respectfully submitted that the references relied on, whether taken alone or otherwise, do not suggest in any way modifying the reference so as to address the particular problems -- not just any problem, as suggested by the Answer -- that are met by the presently claimed subject matter for the reasons discussed above, so that claim 13

is allowable.

It is also again respectfully submitted that the Final Office Action offers no real evidence concerning the problems to which the subject matter of the rejected claims are directed. It is respectfully submitted that there is no evidence whatsoever -- except subjective speculation -- that the references relied upon makes obvious all of the features discussed above of claim 13, as well as its respective dependent claims 14 and 24, as discussed above. It is therefore respectfully submitted that all rejected claims 13, 14 and 24 are allowable for these further reasons -- like allowed and/or allowable claims 15 to 23.

It is also respectfully submitted that the Answer also does not adequately address the fact that not even a *prima facie* case has been made in the present case for obviousness, since neither the Answer nor the Office Actions to date never made any findings, such as, for example, regarding in any way whatsoever what a person having ordinary skill in the art would have been at the time the claimed subject matter of the present application was made.

The Answer only asserts that the state of the art is reflected by the two references relied upon, but this wholly ignores what the Federal Circuit has specifically said on this matter in the case of *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998), namely that the factual predicates underlying a *prima facie* obviousness determination include the *scope and content of the prior art*, the *differences between the prior art and the claimed invention*, and *the level of ordinary skill in the art*. (See also *In re Kotzab*, 55 U.S.P.Q. 2d 1313, 1317 (Fed. Cir. 2000) (citing *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1618 (Fed. Cir. 1999) (obviousness rejections reversed where no findings were made “concerning the identification of the relevant art”, the “level of ordinary skill in the art” or “the nature of the problem to be solved”))). The level of ordinary skill in the art is plainly distinguished from the other factual predicate of the scope and content of the prior art. The Answer conveniently ignores this distinction.

In view of the foregoing, it is again respectfully submitted that the present lack of any of the required factual findings forces both Appellants and this Board to resort to unwarranted speculation to ascertain exactly what facts underly the present rejections. The law mandates that the allocation of the proof burdens requires that the Patent Office provide the factual basis for rejecting a patent application under 35 U.S.C. § 103. (See *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984) (citing *In re Warner*, 379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967))). In short, the Examiner bears the initial burden of presenting a proper prima facie unpatentability case -- which he has wholly failed



to do in the present case. (See In re Oetiker, 977 F.2d 1443, 1445, 24, U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992)).

Accordingly, it is respectfully submitted that claim 13 and its dependent claims 14 and 24 are allowable over the references relied upon for these reasons (like claim 15, which should now stand allowed, and like claims 16 to 23, which were only objected to but which are otherwise allowable).

It is therefore respectfully submitted that the rejected claims 13, 14 and 24 are allowable over the references relied upon in the Final Office Action.

### **CONCLUSION**

In view of the above, it is respectfully requested that the rejections of claims 13, 14 and 24 be reversed, and that claims 13, 14 and 24 be allowed as presented (together with allowed and/or allowable claims 15 to 23).

Dated: 8/27/2001

Respectfully submitted,

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